We claim:

Claim 1. A method for determination of reaction kinetics of surface degradation of a biodegradable polymer comprising the steps of:

providing the biodegradable polymer;

initiating degradation of the polymer;

subjecting the polymer in which degradation has been initiated to ToF SIMS spectral analysis;

identifying and quantifying oligomers at the surface of the polymer from the ToF SIMS spectra as a function of time; and

calculating the rate of formation of one or more oligomers at the surface of the polymer, wherein the rate of formation of one or more oligomers is indicative of the rate of degradation of the polymer.

Claim 2. The method of claim 1 wherein the polymer is selected from the group consisting of polyesters, polyanhydrides, copolymers of polyesters and polyanhydrides and mixtures thereof.

Claim 3. The method of claim 2 wherein the polyester is selected from the group consisting of poly(α-hydroxy acids), poly(β-hydroxy acids), poly(α-malic acids), pseudo poly(α-amino acids), copolymers thereof and mixtures thereof.

Claim 4. The method of claim 2 wherein the polyanhydride is selected from the group consisting of homo-polyanhydrides of sebacic acid, homo-polyanhydrides of fumaric acid, random co-polyanhydrides of sebacic and fumaric acids, and mixtures thereof.

Claim 5. The method of claim 1 wherein the step of initiating degradation comprises solvating the polymer.

Claim 6. The method of claim 1 wherein the step of initiating degradation comprises desorbing the polymer.

Claim 7. The method of claim 1 wherein the step of initiating degradation comprises dissociating the polymer.

Claim 8. The method of claim 1 wherein the step of initiating degradation comprises hydrolyzing the polymer.

Claim 9. The method of claim 1 wherein the step of initiating degradation comprises dissolving the polymer.

Claim 10. The method of claim 1 wherein the step of initiating degradation comprises oxidizing the polymer.

Claim 11. The method of claim 1 wherein the step of initiating degradation comprises reducing the polymer.

Claim 12. The method of claim 1 wherein the step of initiating degradation comprises photolysing the polymer.

Claim 13. The method of claim 1 wherein the step of initiating degradation comprises diffusing the polymer.

Claim 14. The method of claim 1 wherein the step of initiating degradation comprises abrading the polymer.

Claim 15. The method of claim 1 wherein the step of initiating degradation comprises cracking the polymer.

Claim 16. The method of claim 1 wherein the step of initiating degradation comprises peeling the polymer.

Claim 17. The method of claim 1 wherein the step of initiating degradation comprises mechanically breaking the polymer.

Claim 18. The method of claim 1 wherein the step of initiating degradation comprises spinodally decomposing the polymer.

Claim 19. The method of claim 8 wherein the step of hydrolyzing comprises contacting the polymer with at least one saline buffer having a pH between about 2.0 and about 12.0, wherein the saline buffer contains an ion selected from the group consisting of phosphate, acetate, carbonate, biphthalate and mixtures thereof.